PRELIMINARY PROGRAM

AEHS Foundation

October 15–18, 2018
University of Massachusetts
Amherst, MA

Register by September 28th and SAVE! *Registration Form Inside*

140 Presenters + 50 Posters + 9 Workshops + 45 Exhibitors

The 34th Annual International Conference on

Soils, Sediments, Water and Energy

Assessment, Remediation, Regulation and the Energy Environmental Interface

presented by
The Association for Environmental Health & Sciences Foundation, Inc.

Conference Co-Directors

Paul Kostecki, Ph.D. *University of Massachusetts Amherst*
Edward J. Calabrese, Ph.D. *University of Massachusetts Amherst*
Clifford Bruell, Ph.D. *University of Massachusetts Lowell*

AEHS Foundation Semi-Annual Meeting www.AEHSFoundation.org

IN PARTNERSHIP WITH AECOM integral consulting inc. ISEF SURF SUSTAINABLE REMEDIATION FORUM

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REGENESIS Society of SAME American Military Engineers ARCADIS Remediation Partners TRC Results you can rely on

CONFERENCE at a GLANCE

Conference platform sessions and workshops may run concurrently. Please check the schedule carefully. This is a preliminary program and is subject to change. You may contact AEHS Foundation to confirm program details prior to making travel plans.

Monday, October 15, 2018 (Monday is workshops only)

Registration: 10:00am – 5:00pm

Workshop 1 (1:00pm – 4:00pm) Environmental Forensics: Applications and Advances in Fingerprinting Techniques to Determine Responsibility for Releases of Organic Contaminants into the Environment

Workshop 2 (1:00pm – 5:00pm) Tools for Evaluating Sustainability at Tier 2 Sites

Workshop 3 (1:00pm – 5:00pm) Per- and Polyfluoroalkyl Substances (PFAS): The Latest Information

Workshop 4 (1:00pm – 5:00pm) A View From Above: Environmental Monitoring and Surveillance Through Unmanned Aerial Vehicles (UAVs)

Tuesday, October 16, 2018

Registration: 7:30am – 7:00pm | **Exhibit Hall Hours:** 9:00am – 7:00pm

Morning Platform Sessions/Workshop

8:30am – 12:00pm, *Sessions and Workshop 5 are concurrent*

Session 1: Asbestos in Soil: Navigating a Complex Landscape
Session 2a: Bioremediation
Session 2b: In-Situ Chemical Oxidation
Session 3: Current Understanding of LNAPL Remedy Performance and Selection

Workshop 5 (8:30am – 12:00pm) Indicators, Tracers and Surrogates (ITS) for Chlorinated Vapor Intrusion (CVI): Pursuing Additional Observations

LUNCHEON:
12:00pm – 1:30pm

Speaker: Catherine D'Amato, President and CEO, Greater Boston Food Bank, Boston, MA

How Soil Can End Hunger

Afternoon Platform Sessions

1:30pm – 5:30pm, *Sessions are concurrent*

Session 4: Vapor Intrusion
Session 5a: Organizational Drivers for Sustainable Remediation Panel
Session 5b: Advancing the Practice of In-Situ Remediation
Session 6: New Challenges in Evaluating and Communicating Health Risks
Session 7: Emerging Issues of Environmental Concern (starts at 3:30pm)

Poster Session 3:00pm – 6:00pm

Wine/Welcome Reception 5:00pm – 7:00pm

Evening Workshops

Workshop 6 (6:30pm – 9:30pm) Improved Metrics for LNAPL Remedial Technology Selection

Workshop 7 (6:30pm – 9:30pm) Per- and Polyfluoroalkyl Substances (PFAS) Remediation Workshop

Wednesday, October 17, 2018

Registration: 7:30am – 7:00pm | **Exhibit Hall Hours:** 9:00am – 7:00pm

Morning Platform Sessions

8:30/9:00am – 12:00pm, *Sessions are concurrent*

Session 8: Per- and Polyfluoroalkyl Substances (PFAS) Hot Topics
Session 9a: Sustainable Remediation – The Bigger Picture
Session 9b: Sustainable Remediation – The Proof Is in the Practice
Session 10a: Environmental Forensics
Session 10b: Sediments
Session 11: Evolving Approaches to NRD Assessment and Restoration

LUNCHEON:
12:00pm – 1:30pm

Speaker: Alexandra Dapolito Dunn, Regional Administrator, US EPA, Region 1, Boston, MA

EPA Priorities for a Healthy New England

Afternoon Platform Sessions

1:30pm – 4:30/5:00pm, *Sessions are concurrent*

Session 12a: PFAS Case Studies
Session 12b: PFAS Sampling and Analysis Issues
Session 13a: Tools to Support Your Sustainable Remediation Strategy
Session 13b: Advances in Remediation
Session 14: Current Issues in Water Sustainability and Remediation
Session 15: Practical Soil and Groundwater Cleanup Technology Applications

Poster Session 3:00pm – 6:00pm

Social 5:00pm – 7:00pm

Evening Workshops

Workshop 8 (6:30pm – 9:30pm) PFAS Treatment Technologies and Remediation Strategies

Workshop 9 (7:00pm – 9:00pm) Environmental Ethics: A Tragedy of the Commons Perspective

Thursday, October 18, 2018

Registration: 7:30am – 12:00pm | **Exhibit Hall Hours:** 9:00am – 12:00pm

Morning Platform Sessions

8:30/9:00am – 12:00pm, *Sessions are concurrent*

Session 16: PFAS: State Case Studies, Policy Developments, and Lessons Learned Panel
Session 17: Environmental Justice
Session 18: Brownfields
Session 19: Site Remediation Applications

Who Should Attend

- Environmental science educators and students
- Federal, state, county, and municipal officials responsible for the development and implementation of environmental regulatory programs
- Agencies and organizations responsive to issues arising from contaminated soils, sediments, water, and air
- Consultants providing environmental contaminant assessment, advice, and guidance
- Attorneys concerned with client environmental contaminant issues
- Environmental scientists, engineers, managers, and consultants
- Analytical laboratory staff specializing in environmental contamination
- Real estate, insurance, and banking representatives

Conference Highlights

- Strong technical presentations for immediate application
- Excellent networking opportunities
- Active participation from military, academia, regulatory agencies and the oil and gas industry

Government/Regulator Friendly

Federal, state, and municipal personnel receive:

- Special reduced registration rates
- Complimentary workshops (see registration form for details)

Socials

- Tuesday evening Wine Reception from 5:00pm – 7:00pm in the exhibit areas
- Wednesday evening Social from 5:00pm – 7:00pm in the exhibit areas
- Poster session socials

MICHAEL E. MILLER STUDENT COMPETITION

We are proud to announce the 15th Annual Student Competition for best student poster presentation at the conference. One $1000.00 cash prize and two $500.00 cash prizes will be awarded to the three best student poster presentations. Winners will be announced on Wednesday. See posting at registration desk.

Must be entered prior to the conference in order to compete. Open to all full- and part-time students (post-docs excluded). Must be a student at the time of the competition.

See www.AEHSFoundation.org for full details and previous winners.

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WORKSHOPS

All workshops are FREE to municipal, state, and federal personnel registered for the conference. Use discount code REG-MSF. Pre-registration is required. If you are registering as "workshop only" and are not registering for the conference, the workshop only fee ($150.00) applies. See registration for details.

Workshop 1 1:00pm – 4:00pm

Environmental Forensics: Applications and Advances in Fingerprinting Techniques to Determine Responsibility for Releases of Organic Contaminants into the Environment

Paul Philp, University of Oklahoma, Norman, OK

The concept of environmental forensics has evolved significantly over the years. Basically, it is concerned with establishing the relationship between a contaminant in the environment and its suspected source(s), or point(s) of release. Such contaminants may cover a wide range of compounds or mixtures of compounds, ranging from volatile compounds, such as benzene or chlorinated solvents, refined products, crude oils, or complex mixtures of aromatic compounds. They may be present as free product, dissolved in water, adsorbed on soil particles, or in the vapor phase. A wide variety of techniques exist to characterize and establish their potential relationship with possible sources or points of release. The standard EPA methods are of little use in forensic studies since those methods are directed towards monitoring concentration data for specific contaminants of interest rather than determining the source.

Forensic investigations typically use a tiered approach in terms of fingerprinting tools. Preliminary characterization is undertaken by gas chromatography (GC) followed by more detailed analyses by gas chromatography-mass spectrometry (GCMS). The fingerprints, or chromatograms, obtained in this manner often provide sufficient information to determine relationships between contaminants and possible release points. However, there are also many cases where the resulting GC and GCMS data are ambiguous and possibly misleading. In such cases it is possible to go to a more specialized tier of analyses and utilize the stable isotope composition of individual contaminant compounds. This is particularly valuable for single component contaminants, such as MTBE, BTEX, or PCE, where GC and GCMS are of virtually no use for correlation or source differentiation.

Early applications of stable isotopes to environmental problems were limited to carbon and hydrogen isotopes. Chlorine isotopes can now be routinely measured for most of the common chlorinated groundwater contaminants and, in the not too distant future, bromine isotopes will also be routinely available. This introduces the possibility of a 3D isotope approach for both source correlations and attenuation studies. Stable isotopes, including Cl, are well suited for use in the rapidly emerging area of vapor intrusion studies to differentiate indoor sources of contaminants versus subsurface contaminants.

While most environmental isotope studies have been concerned with stable isotopes, there are a small number of studies using ^{14}C for certain applications. These studies are limited due to the half-life of ^{14}C, but interesting applications related to biofuels and distinguishing brominated compounds biosynthesized by marine organisms from those in fire retardants have been published and will be discussed.

Finally, the use of the various fingerprinting techniques for monitoring attenuation at sites undergoing remediation will be discussed. The combined use of the stable isotopes, GC, and GCMS can be extremely valuable tools for monitoring remediation as well as determination of the onset of natural attenuation.

Workshop 2 1:00pm – 5:00pm

Tools for Evaluating Sustainability at Tier 2 Sites

Sabine E. Apitz, Ph.D., SEA Environmental Decisions, Little Hadham, UK
Deborah Edwards, Ph.D., ExxonMobil, Baytown, TX
Anne Fitzpatrick, LHG, Geosyntec Consultants, Seattle, WA
David Harrison, Ph.D., NERA Economic Consulting, Boston, MA
Amanda McNally, PE, Geosyntec Consultants, Pittsburgh, PA
Gerlinde Wolf, PE, AECOM, Latham, NY

At the 2017 AEHS Foundation East Coast Conference, our team presented a workshop on sustainable remediation that demonstrated a suite of tools that were utilized for a complex, comprehensive sustainability analysis for the Portland Harbor Sediment Superfund Site in Portland, Oregon in 2016. Participants in the workshop included representatives from state regulatory agencies in seven states and two federal agencies.

While tools for the detailed assessments of large, complex sites have generated great interest, there was a need to modify the tools and approaches to provide results for smaller sites or complicated sites at an earlier stage of the remediation life cycle when less detailed data are available. More quantitative modeling is needed as many of the simpler tools currently available to the remediation industry fail to address all three pillars of sustainability (i.e., environmental, social, and economic) or only do so in a qualitative manner.

A set of "Tier 2" tools is being developed that can be used to evaluate sustainability of remedial actions at smaller or less complex sediment sites that may not have as much data available as a large Superfund site such as Portland Harbor. Similar to the tools developed for Portland Harbor, the Tier 2 tools are being designed to address environmental, economic, and social impacts of remediation, while linking metrics to both regulatory decision criteria and stakeholder values. Our goal is to make the Tier 2 tools flexible and adaptable to different regulatory frameworks and stakeholder dynamics. Initially, the focus is on applications to smaller sediment sites, but eventually the tools will be adapted to address other media such as soil and groundwater.

This workshop will serve as a follow-up to the 2017 workshop and will include the following:

- Discussion of the data gaps that exist between Tier 1 (i.e., simple) and Tier 3 (i.e., complex) assessments in terms of environmental, social, and economic analysis of remedial alternatives for less complex cleanup sites.
- Description of the beta versions of Tier 2 environmental, social, and economic tools developed by the team. The types and quantity of data available at various stages of a project life cycle, types of decisions that are addressed by the tools, and minimum level of input required for meaningful execution of the tools will be discussed.
- Analysis of one or more case studies to illustrate the application of the beta versions of the tools.
- Discussion of uncertainty and sensitivity of the results to various inputs.
- Preview of (and opportunity to comment on) the plan for finalization and rollout of the Tier 2 tools for use by regulatory agencies, remediation practitioners, and stakeholder groups.

Workshop participants will engage in a detailed demonstration of the tools developed by this team, including the required inputs, mapping of metrics to both regulatory criteria and stakeholder values, calculation methodologies, and the numerical and graphical outputs generated. Participants will be asked to provide feedback on the applicability of the tools developed to a range of smaller sediment remediation sites and on the usability and benefit of the tools to remediation projects in general. A final set of tools will ultimately be made available for use by agencies and interested parties to enable meaningful assessments of the sustainability of remediation alternatives. This approach will allow a broad-based group of stakeholders to be transparently engaged in the decision-making process, thereby resulting in more sustainable remedies with broader regulatory and public support.

Continuing Education Credit Offered at This Conference

Types of credits:

- MA LSP Credits*
- CT LEP Credits*
- NJ LSRP Credits*
- FL PE Credits*
- NH PEs (select certificate of attendance)
- Certificate of Attendance

ATTENTION NH PEs - Our Certificate of Attendance is accepted by the board of licensure and certification for NH PEs!

**pending 2018 program approval*

To receive credit you must:

- Register to receive CEUs (pay the $50 fee for CEUs during registration). If you are not registered, and would like to receive CEUs, please contact the office or visit the onsite registration desk at the conference
- Sign in AND out at the session and workshop doors (exception: LSPs sign in and out at the conference desk for the conference and at the workshop doors for workshops)
- Show a picture ID when signing in and out
- Complete and return evaluation form, if required

Questions? **Contact the Conference Coordinator at 413-549-5170 or Brenna@aehsfoundation.org**

Credits are awarded as follows:

- ½ credit per hour of session attendance (LSPs, LEPs, LSRPs)
- 1 credit per hour of session attendance (PEs)
- 1 credit per hour of workshop attendance
- Some workshops or sessions may be excluded from receiving credit (will be noted in workshop or session description in program)

All certificates are mailed by mid-November

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WORKSHOPS

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Workshop 3 1:00pm – 5:00pm

Per- and Polyfluoroalkyl Substances (PFAS): The Latest Information

Elizabeth Denly, ASQ CMQ/OE, TRC Environmental Corporation, Lowell, MA
Michael Eberle, TRC Environmental Corporation, Philadelphia, PA
Jenny Phillips, DABT, TRC Environmental Corporation, Fort Collins, CO
Paul Locke, MassDEP, Bureau of Waste Site Cleanup, Boston, MA
James Occhialini, Alpha Analytical Laboratories, Westborough, MA
Kenneth F. Gray, Esq., Pierce Atwood LLP, Portland, ME

PFAS (per- and polyfluoroalkyl substances) are a diverse group of man-made chemicals that are resistant to heat, water, and oil. The most prominent PFAS include perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). PFAS have been detected at concentrations above state standards and EPA Health Advisory Levels in public water systems throughout the United States. PFAS are ubiquitous and have been historically produced for widespread uses such as carpeting, apparel, firefighting foams, and metal plating. PFAS are likely to be found at refineries, military bases, airports, landfills, sludge/biosolids land application sites, fire training facilities, rail yards, chemical facilities, plating facilities, and semiconductor manufacturing facilities.

An increasing number of studies indicate that PFAS are widespread globally. Their persistence and ability to transport are becoming an increasing area of concern. Resistance to natural attenuation processes in groundwater is a cause for concern for long-distance migration in plumes. Because of this, demand for PFAS testing and analysis has increased. PFAS are also ubiquitous, which presents both a sampling challenge and an important consideration in source attribution by regulators.

This workshop is designed to provide a comprehensive understanding of many different issues and the most up-to-date information associated with PFAS including the following: history and sources of PFAS; regulatory status and future implications; the unique chemistry of PFAS, including precursors; exposure, health effects, and toxicity; sampling and analytical challenges and options; fate and transport; remediation challenges; data evaluation; and forensics. Because of the many PFAS lawsuits in New England and elsewhere, this panel will address legal issues arising from PFAS contamination and legal liabilities that could arise from consultant and engineering practices. The presenters were selected based on their intimate knowledge of the issues and their ability to answer real-world questions. Attendees are encouraged to bring questions for discussion about the technical and regulatory challenges faced with PFAS investigations.

Workshop 4 1:00pm – 5:00pm

A View From Above: Environmental Monitoring and Surveillance Through Unmanned Aerial Vehicles (UAVs)

Moderator: Thomas Potter, MassDEP, Boston, MA

Samuel Nelson, MassDOT Aeronautics, Boston, MA
Andrew Bakinowski, Weston & Sampson, Foxborough, MA
Nate Northey, Weston & Sampson, Peabody, MA
McCain McMurray, Juniper Unmanned, Golden, CO

Unmanned Aerial Vehicles (UAVs), better known as "drones," are commonly thought of as having military and surveillance applications. With the improvement in the technology and ready availability of "consumer" and "prosumer" drones, day-to-day field applications are quickly being supported by drone technology. The availability and proliferation of the technology has provided the general population with a multitude of possibilities. In the environmental field, the use of drones for photo documentation and other field data collection is providing high quality photos for technical and scientific review but also can support regulatory decision making. In addition, the ability to reproduce the same flight path over and over again and take photographs can be used to document operational and maintenance issues associated with energy infrastructure such as utility-scale solar photovoltaic arrays and hydroelectric dams. Other areas that are generally difficult to reach due to water or dense vegetation can be accessed from the air. This workshop will highlight the expanding use and application of UAV technology throughout the environmental industry. The State of Massachusetts has charged the Department of Transportation, through their Aeronautical Division, to develop state-wide policies on use and airspace issues. An overview of this important topic will be presented. A field exercise, including information on optional UAV purchase, will also be conducted.

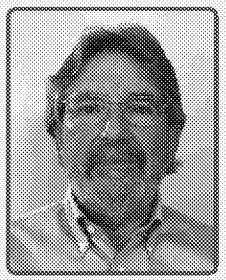
This workshop will address the following topics:

- Introduction to Technical Aspects of UAVs – General Surveys and Detailed Information Gathering (40 min.)
- Regulatory Considerations of Flight – Massachusetts Policy Development (30 min.)
- Licensing UAV Requirements (20 min.)
- Case Studies – Field Mapping and Reconnaissance and Clean Energy Infrastructure O&M (e.g., utility-scale solar arrays) (30 min.)
- Environmental Monitoring and Surveillance (1 hr.)
  - Massachusetts Contingency Plan (MCP) Applications (e.g., Conceptual Site Model)
  - Natural Resource Damages Assessment and Restoration Applications (e.g., Adaptive Management/Assessment)
- A Field Demonstration of UAV Operation, Flight, and Application (1 hr.)

The information will be presented using a combination of overview presentations and facilitated Q&A along with a field demonstration. This workshop will help to connect the regulated community, municipalities, project developers, job seekers, students, and the interested public with UAVs and their associated environmental monitoring and surveillance capabilities.

Announcing the 2018 AEHS Foundation Achievement Awards

The Annual International Conference on Soils, Sediments, Water, and Energy is pleased to announce this year's recipients of the AEHS Foundation Achievement Award. This award is presented to individuals who have shown significant contributions to the field as well as outstanding environmental stewardship. Visit www.aehsfoundation.org for the full announcement.



James C. Colman
Former Assistant Commissioner, Massachusetts Department of Environmental Protection, Boston, MA

In Memoriam

Derek Tomlinson
Science, Engineering & Technology Leader, GEI Consultants, Exton, PA

Ann Aschengrau
ScD, Professor of Epidemiology, Boston University, School of Public Health, Boston, MA

PLATFORM SESSIONS/WORKSHOP

Session 1: 8:30am – 12:00pm

Asbestos in Soil: Navigating a Complex Landscape

Session Chairs: Janine Commerford, L.S.P., Haley & Aldrich, Inc., Boston, MA
Millie Garcia-Serrano, M.P.H., MassDEP, Southeast Region, Lakeville, MA

Massachusetts has no single program that clearly addresses the notification, assessment, cleanup, and disposal of soil contaminated with asbestos. Overlapping regulatory jurisdictions create confusion about what oversight and approvals are required and what performance standards apply. If asbestos in soil is discovered – even at *de minimus* levels – construction delays, project redesign, and substantial unanticipated costs for soil management and removal may result. Speakers in this session will describe their experiences in managing sites where asbestos in soil has been found and discuss and debate options for program improvements.

8:30 **Hidden in Plain Sight – Asbestos-in-Soil Case Studies**
Kate Dilawari, Haley & Aldrich, Inc., Boston, MA

9:00 **Non-Traditional Work Plans: What to Expect**
Bob Pelletier, Woodard & Curran, Inc., Andover, MA

9:30 **Managing Asbestos in Soil Utilizing a Hybrid Regulatory Approach – Case Studies from MassDEP's Western Region**
Eva R. Tor, MassDEP, Bureau of Waste Site Cleanup, Springfield, MA

10:00 **BREAK**

10:30 **Analytical Issues: Measuring Asbestos in Soil**
TBD

11:00 **Response Actions for Asbestos at MCP Sites: Options & Opportunities**
Paul Locke, MassDEP, Bureau of Waste Site Cleanup, Boston, MA

11:30 **Panel Discussion**

Session 2a: 8:30am – 10:00am

Bioremediation

Session Chair: Christopher Teaf, Florida Sate University, Tallahassee, FL

8:30 **Evolution of a Large-Scale Bioremediation Project**
Dustin Bytautas, AECOM, Rocky Hill, CT

9:00 **Post-Remediation Performance and Aquifer pH**
Ed Alperin, Draper Aden Associates, Raleigh, NC

9:30 **Combination Amendment for Biotic and Abiotic Dechlorination for Treatment of Large, Dilute Plume Using Permeable Reactive Barriers in Low pH Aquifer**
Paul Dombrowski, ISOTEC Remediation Technologies, Lawrenceville, NJ

10:00 **BREAK**

Session 2b: 10:30am – 12:00pm

In-Situ Chemical Oxidation

Session Chair: Paul Dombrowski, ISOTEC Remediation Technologies, Lawrenceville, NJ

10:30 **Combining Persulfate, In Situ Ferrate Generation and Enhanced Bioremediation for Safer, More Effective Remedial Actions**
Will Moody, Provectus Environmental Products, Freeport, IL

11:00 **Innovative Carbohydrate (CH) Activation of Persulfate – Comparative Evaluation of Multiple Food-Grade CH Activators**
Prasad Kakarla, In-Situ Oxidative Technologies, Inc., Lawrenceville, NJ

11:30 **Heat-Activated Sodium Persulfate Treatment of Phthalates**
Amine Dahmani, SESI Consulting Engineers, Pine Brook, NJ

Session 3: 8:30am – 12:00pm

Current Understanding of LNAPL Remedy Performance and Selection

Session Chairs: Andrew Kirkman, BP, Naperville, IL
Steven Gaito, AECOM, Providence, RI

8:30 **Smart Approaches for Investigation & Remediation of LNAPL in Bedrock**
David de Courcy-Bower, Environmental Resources Management, Milwaukee, WI

9:00 **Challenges in Residual Saturation Definition**
Michael Gefell, Anchor QEA, Lakewood, CO

9:30 **Field Implementation Challenges of LNAPL Transmissivity as a Remedial Performance Metric**
Kevin Wheeler, Sovereign Consulting Inc., Robbinsville, NJ

10:00 **BREAK**

10:30 **Connecting Long-Term Monitoring Regulatory Requirements to LNAPL Data Sets**
Benjamin McAlexander, Trihydro, Orono, ME

11:00 **Natural Source Zone Depletion Rates Based on Analyses of Empirical Soil Gas Data**
Matthew Lahvis, Shell, Spring, TX

11:30 **Phytoremediation Applied to LNAPL/TPH in Soil and Dissolved-Phase in Groundwater**
Chris Pearson, AECOM, Greenwood Village, CO

Workshop 5 8:30am – 12:00pm

Indicators, Tracers and Surrogates (ITS) for Chlorinated Vapor Intrusion (CVI): Pursuing Additional Observations

Henry Schuver, US EPA, Washington, DC
Chris Lutes, Jacobs, Raleigh, NC
Chase Holton, Jacobs, Englewood, CO
Jeff Kurtz, Geosyntec Consultants, Greenwood Village, CO
Robert Truesdale, RTI International, Research Triangle Park, NC

Three supplemental measures of CVI-related phenomena, referred to here as ITS, specifically temperature, pressure, and radon, have shown some promise for being readily implementable tools for improving the effectiveness and efficiency of CVI assessments and long-term monitoring. These measurements and observations were presented in AEHS Foundation's West Coast Conference (slides and audio recordings available at https://iavi.rti.org/WorkshopsAndConferences.cfm) and subjected to additional analyses. In summary, there is some evidence for reducing the number of indoor air samples needed to be statistically confident of representing the upper 95th percentile (e.g., Reasonable Maximum Exposure) conditions from 58 randomly timed samples to as few as three ITS-guided samples. Additional analyses for representing lower risk-based levels of concern (e.g., 0.48 ug/m^3 TCE) showed that 95% confidence was possible with as few as two temperature-guided samples and one radon-guided sample. To further validate these ITSs in other buildings and settings, plans are 1) to further statistically test existing data sets and 2) to collect new ITS measurements during ongoing VI investigations. Where there is some evidence of a 'complete' CVI pathway, supplemental ITS measures taken concurrently along with indoor CVOC samples could provide additional evidence to illustrate the associations with ITS and provide an improved understanding of the value of the CVOC samples collected. For example, the evidence available so far indicates there is ~95% confidence in 'low' (non-RME) CVOC results being found when any of the three ITS were found to be 'low.' Thus, CVOC samples showing 'low' concentrations collected at times when the ITS values indicate a 'low' potential for VI would not be as meaningful as CVOC samples showing 'low' concentrations that were collected at times when the ITS indicated significant soil gas intrusion was occurring. This workshop will present draft Standard Operating Procedures (SOPs) for adding these ITS measures to ongoing investigations and seek feedback on this.

PLATFORM SESSIONS

Session 4: 1:30pm – 5:30pm
Vapor Intrusion
Session Chair: Jay Clausen, USACE ERDC-CRREL, Hanover, NH

1:30 **Summary of State Approaches to Vapor Intrusion – 2018 Update**
Richard Rago, Haley & Aldrich, Inc., Rocky Hill, CT

2:00 **Vapor Intrusion Sampling and Analytical Methods Comparison**
Jay Clausen, USACE ERDC-CRREL, Hanover, NH

2:30 **A Case Study of Vapor Intrusion Issues at a Large Government Facility**
Darrell Moore, U.S. Army Corps of Engineers, Concord, MA

3:00 **BREAK**

3:30 **Use of Mass Loading Assessments to Characterize Vapor Intrusion Potential**
Theresa Gabris, Geosyntec Consultants, Washington, DC

4:00 **Using Radon as a Surrogate for VOCs to Determine Building-Specific Attenuation Factors in Vapor Intrusion Assessments**
Anthony Miller, Gannett Fleming, Madison, WI

4:30 **Combined Remedy Approach for Chlorinated Vapor Intrusion/Mitigation and Groundwater Remediation Under a Residential Neighborhood**
Tom Szocinski, Land Science, San Clemente, CA

5:00 **Summary of the EPA Workshop on SOPs for Collecting Indicators, Tracers & Surrogates of VI**
Henry Schuver, US EPA, Washington, DC

Session 5a: 1:30pm – 3:00pm
Organizational Drivers for Sustainable Remediation Panel
Session Chairs: Paul Hadley, Sustainable Remediation Forum (SURF), Davis, CA
Jake Torrens, Haley & Aldrich, Inc., Oakland, CA

SURF enjoys a diverse membership, including representatives from major organizations in government, manufacturing, energy, and transportation sectors. A panel of SURF members will discuss the opportunities, the challenges, and the drivers that have they have found to be successful in developing and implementing sustainable remediation programs within their organizations.

Session 5b: 3:30pm – 5:30pm
Advancing the Practice of In-Situ Remediation
Session Chair: Dick Raymond, Terra Systems, Claymont, DE

3:30 **Lessons Learned from Surfactant Enhanced Aquifer Remediation of Light and Dense NAPLs**
David Alden, Tersus Environmental, Wake Forest, NC

4:00 **Performance Monitoring in Clay Till Three Years After Full-Scale ZVI Treatment with DPT Jet Injection**
Drew Baird, FRx, Greenville, SC

4:30 **Surfactant Use to Enhance Performance of Chemical Oxidation Remediation**
Dan Socci, EthicalChem, South Windsor, CT

5:00 **Novel Approaches to In-Situ Injections in Bedrock**
A. Curtis Weeden, Jr., AECOM, Amherst, NH

Session 6: 1:30pm – 5:30pm
New Challenges in Evaluating and Communicating Health Risks
Session Chair: Russ Keenan, Integral Consulting, Inc., Portland, ME

1:30 **Vapor Intrusion of 1,4-Dioxane – Regulatory Myth or Real Issue?**
Shawn Sager, Arcadis, Raleigh, NC

2:00 **Emerging Contaminant Management – Maine's Unique Case Study**
Kerri Malinowski, Maine Department of Environmental Protection, Augusta, ME

2:30 **Effectively Communicating Risk and Toxicology, from Expert Reports and Depositions to Trial Testimony – What Judges and Juries Hear**
Graham Ansell, Integral Consulting, Inc., Annapolis, MD

3:00 **BREAK**

3:30 **Communicating Biosolids Recycling: Past and Current Challenges**
Ned Beecher, North East Biosolids & Residuals Association (NEBRA), Tamworth, NH

4:00 **Implications of the New PAH Toxicity Values on Site Remediation**
Amy Rosenstein, Lexington Environmental Risk Group, LLC, Lexington, MA

4:30 **Assessing Risks of Using Soils in Landfills as Cover**
Stephen Zemba, Sanborn, Head & Associates, Inc., Randolph, VT

5:00 **Toxicology, Health Risk and Evaluating Appendices III and IV of the Coal Combustion Rule Regarding Groundwater**
Christopher Teaf, Florida State University, Tallahassee, FL

Session 7: 3:30pm – 5:30pm
Emerging Issues of Environmental Concern: Transforming the Solid Waste Crisis into a Sustainable Materials Management Winning Strategy
Session Chair: Lorenzo Macaluso, Center for EcoTechnology, Pittsfield, MA

3:30 **MassDEP's Solid Waste Master Plan – A Sustainable Materials Vision for 2020 - 2030**
John Fischer, MassDEP, Bureau of Air & Waste, Boston, MA

4:00 **Contending with the Impacts of the China National Sword Policy to the Local and Global Recycling Markets**
Greg Cooper, MassDEP, Bureau of Air & Waste, Boston, MA

4:30 **A Success Story of Farm-Based Anaerobic Digestion**
Bill Jorgenson, Vanguard Renewables, Wellesley, MA

5:00 **Textile Recovery and Recycling – A Missed Opportunity**
Larry Groipen, Secondary Materials and Recycled Textiles Association (SMART), Abingdon, MD

ATTENTION ENVIRONMENTAL PROFESSIONALS!

Environmental Career Networking Event

Tuesday, October 16th
5:00pm-7:00pm
Amherst Room, 10th Floor, Campus Center

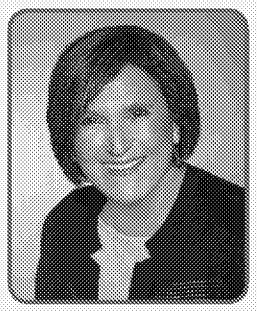
AEHS Foundation has teamed up with UMass School of Earth & Sustainability to offer an exciting career-networking event for UMass students. Registration is required. Please email helloSES@umass.edu for more information or to register for this free event.

LUNCHEON

Tuesday, October 16, 2018 12:00pm – 1:30pm

How Soil Can End Hunger

Catherine D'Amato, President and CEO, Greater Boston Food Bank, Boston, MA



Catherine D'Amato will outline the important connection between the land and ending hunger in America. Catherine will tell her story from growing up with immigrant grandparents who farmed in Colorado to working in her parents' restaurant in California. These experiences led her to create the first Food Bank Farm in America in Hadley, Massachusetts, in 1991. This farm is one of the largest Community Supported Agricultural (CSA), farms with nearly 500 shareholders. She will make the connection between protecting our environment and ending hunger in America.

Workshop 6 6:30pm – 9:30pm

Improved Metrics for LNAPL Remedial Technology Selection

Steven Gaito, AECOM, Providence, RI
J. Michael Hawthorne, P.G., REM, CAPM, GEI Consultants, Inc., Denver, CO
Parisa Jourabchi, Golder Associates, Vancouver, BC, Canada
Andrew Kirkman, BP, Naperville, IL
Natasha Sihota, Chevron, San Ramon, CA

Hydrocarbon sites where remedies have been implemented but have not yet achieved clean-up criteria (soil or water target concentrations, or removal to the maximum extent practicable) often suffer from a similar weakness: the lack of a comprehensive conceptual site model. However, it is not the risks or concerns that are poorly defined; rather it is remedy selection that is the problem, a frequently overlooked aspect of the conceptual model. New guidance on "LNAPL Site Management: LCSM Evolution, Decision Process, and Remedial Technologies" by the Interstate Technology & Regulatory Council (ITRC) includes tools to support the development of the remedy selection aspects of the conceptual site model for LNAPL. This aspect of the conceptual model has continued to evolve since the NAPL Clean-up Alliance was initiated under the EPA Remediation Technologies Development Forum for LNAPL before 2001. Initially, advances in the estimation of LNAPL recoverability led to quantification of LNAPL recoverability beyond simplistic measures based on gauged LNAPL thickness, and have improved identification of settings where LNAPL recovery is beneficial and where it may be ineffective because the majority of the LNAPL mass is in a state of residual saturation. More recently, improved understanding of biodegradation of the LNAPL itself has furthered the bases for effective remedial technology selection. In addition, high-resolution tools such as laser-induced fluorescence (LIF), hydraulic profiling tool (HPT), cone penetrometer test (CPT), and membrane interface probe (MIP) have all led to improved understanding of the subsurface LNAPL distribution to assist in targeting effective LNAPL remedies.

This workshop will focus on LNAPL transmissivity, natural source zone depletion (NSZD), methods to enhance NSZD, and what to expect from remedial efforts to assist in remedial decision making. The workshop will explain how to utilize specific methods to gain a qualitative understanding of effective remedial mechanisms (bioremediation, hydraulic recovery, volatilization, and injection technologies) at a given site. These can be evaluated through improved conceptualization of the LNAPL distribution and the soil profile, along with fluid levels combined with LNAPL composition. Quantified metrics may include field-based measures of aerobic and anaerobic bioremediation, LNAPL transmissivity, recovery data analysis, and vapor removal rates versus bioremediation rates.

Notes on various remedial methods will be provided for future reference.

Workshop 7 6:30pm – 9:30pm

Per- and Polyfluoroalkyl Substances (PFAS) Remediation Workshop

Michael Marley, M.Sc., CT LEP, XDD Environmental, Stratham, NH
Ellen Moyer, Ph.D., P.E., Greenvironment, LLC, Montgomery, MA
Raymond G. Ball, Ph.D., P.E., L.S.P., EnChem Engineering, Inc., Newton, MA

This workshop covers PFAS physical-chemical properties relevant to remediation, and ex-situ and in-situ options for remediating PFAS in soil and water. Knowledge and experience in PFAS remediation is evolving fast. The workshop presents the most up-to-date information about remediating PFAS using physical, chemical, and biological technologies, covering both technologies that show promise as well as those that are not expected to be effective. Cutting edge technologies using advanced carbon, synthetic resins, alternative natural adsorbents, and advanced oxidation, among others, are explained.

Participants can use this understanding to identify technologies that are likely to be appropriate for a particular site early on in the site characterization process. Integrating key data collection for site-specific remedial options into the characterization phase can minimize project costs and schedule by reducing the number of rounds of fieldwork. The presenters suggest key site data relevant to viable or promising PFAS remedial technologies that can be collected during site characterization. Participants can consider this guidance as they characterize PFAS sites with an eye toward likely future site-specific remedial actions.

Laboratory treatability studies are often critical for technology selection and design. They typically pay back the time and cost involved many times over by improving remediation efficiency and success. Treatability study methods, benefits, and limitations for PFAS remediation are discussed.

Case studies at the bench and field scale illustrate both long- and short-chain PFAS remediation effectiveness. Case studies include a comparison of carbon and ion-exchange resin treatment, and chemical oxidation of PFAS intermixed with chlorinated solvents at an Air Force base, among others.

EVENING WELCOME & WINE RECEPTION

Tuesday 5:00pm – 7:00pm

Wine Bar (open), Refreshments, Light Hors d'Oeuvres

Free to all registered conference attendees

PLATFORM SESSIONS

Session 8: 8:30am – 12:00pm

Per- and Polyfluoroalkyl Substances (PFAS) Hot Topics

Session Chair: Ellen Moyer, Greenvironment, Montgomery, MA

8:30 **Per- and Polyfluoroalkyl Substances in the Environment: Key Challenges and Strategies for Evaluation and Management**
Jennifer Guelfo, Brown University Superfund Research Program, Providence, RI

9:00 **PFAS in New York State Fish, 2010 - 2018**
Jesse Becker, New York State Department of Environmental Conservation, Albany, NY

9:30 **Understanding PFOA: How One College is Examining Background PFAS Soil Concentrations in Rural New England**
Janet Foley, Bennington College, Bennington, VT

10:00 **BREAK**

10:30 **Atmospheric Deposition as a Source of Contamination at PFAS-Impacted Sites**
Christopher Zevitas, US DOT, Volpe National Transportation Systems Center, Cambridge, MA

11:00 **The PFAS Cycle – Landfills, POTWs and Biosolids**
Ross Bennett, Golder Associates Inc., Manchester, NH

11:30 **Avoiding the Epic Fail – PFAS Treatability Testing**
Michael Marley, XDD Environmental, Stratham, NH

Session 9a: 8:30am – 10:00am

Sustainable Remediation – The Bigger Picture

Session Chairs: Gerlinde Wolf, AECOM, Latham, NY
Matthew Ambrusch, Langan Engineering & Environmental Services, Parsippany, NJ

8:30 **The Business Value Case for Sustainable Remediation**
Betsy Collins, Jacobs, Raleigh, NC

9:00 **Superfund, Sustainability & Trump: Progress or the Emperor's New Clothes?**
Norman Dupont, Ring Bender LLLP, Costa Mesa, CA; Howard Cumberland, Geosyntec Consulting, Inc., Portland, OR

9:30 **Sustainable Remediation: Whose Values Are We Sustaining?**
Sabine E. Apitz, SEA Environmental Decisions, Ltd., Little Hadham, Hertfordshire, United Kingdom

10:00 **BREAK**

Session 9b: 10:30am – 12:00pm

Sustainable Remediation – The Proof Is in the Practice

Session Chairs: Gerlinde Wolf, AECOM, Latham, NY
Matthew Ambrusch, Langan Engineering & Environmental Services, Parsippany, NJ

10:30 **Phytoremediation – A Green, Sustainable Approach to Groundwater Restoration**
Erik Pearson, Ramboll, Irvine, CA

11:00 **Sustainability Advantages of Using Institutional Controls to Achieve Site Closure**
Jeff Hullinger, SME, Westerville, OH

11:30 **Incorporating Sustainability into Remedial Decision-Making Led to Case Closure at a Petroleum Site**
Scott Stromberg, Orion Environmental Inc., Long Beach, CA

Session 10a: 8:30am – 10:00am

Environmental Forensics

Session Chair: Dallas Wait, Gradient, Cambridge, MA

8:30 **Developing Geochemical Mn/Ca Ratio as a Tracer for Mn Contamination**
Justin Richardson, University of Massachusetts, Amherst, MA

9:00 **Effective Visual Communication of Complex Source Allocation and Statistics for Environmental Forensics Case Studies**
Court Sandau, Chemistry Matters, Inc., Calgary, AB, Canada

9:30 **Natural Gas Condensate Forensics: A Case Study**
Patricia Tcaciuc, Gradient, Cambridge, MA

10:00 **BREAK**

Session 10b: 10:30am – 12:00pm

Sediments

Session Chair: Timothy Iannuzzi, Arcadis, Annapolis, MD

10:30 **Activated Carbon Update and Overview: Application for Contaminated Sediment Remediation**
John Collins, AquaBlok, Ltd., Toledo, OH

11:00 **US EPA Updates to IRIS: Potential Impacts on Management of Contaminated Sediment Sites**
Amy Nelson, Anchor QEA, Amesbury, MA

11:30 **An Evaluation of Natural Resource Damage Assessment (NRDA) Cases at Sediment Sites: State of the Process and Issues**
Timothy Iannuzzi, Arcadis, Annapolis, MD

Session 11: 9:00am – 12:00pm

Evolving Approaches to NRD Assessment and Restoration

Session Chairs: Karen Pelto and Thomas Potter, MassDEP, Boston, MA

9:00 **Natural Resource Damage Assessment and Restoration (NRDAR) Primer and Federal-State Interactions**
Mark Huston, US Department of the Interior, Office of Restoration and Damage Assessment, Washington, DC

9:30 **Data Gathering and Use for NRD and Remedial Decisions**
Todd Rettig, Illinois EPA, Springfield, IL

10:00 **BREAK**

10:30 **Vermont's New NRD Rule**
Megan O'Toole, Vermont Department of Environmental Conservation, Montpelier, VT

11:00 **Massachusetts' Standard NRD Methods**
Karen Pelto, MassDEP, Boston, MA

11:30 **Strategies and Implementation of Early Restoration**
Jefferson Reynolds, Virginia Department of Environmental Quality, Richmond, VA

POSTER SESSIONS

Authors will be available for individual discussion at their posters on both Tuesday & Wednesday from 3:00pm – 6:00pm

PLATFORM SESSIONS

Session 12a: 1:30pm – 3:00pm

PFAS Case Studies

Session Chair: Elizabeth Denly, TRC Environmental Corporation, Lowell, MA

1:30 **The Discovery of Emerging Contaminants at a Site Approaching Remedial Action Completion**
Nigel Tindall, Jacobs, Mashpee, MA

2:00 **PFAS Contamination from Firefighting Foam Applications at Rollover Sites**
Mary O'Reilly, Jacobs, Mashpee, MA

2:30 **Community Response to Multiple Per- and Polyfluoroalkyl Substance (PFAS) Sites and Impacted Groundwater Supply on Cape Cod**
Thomas Cambareri, Cape Cod Commission, Barnstable, MA

Session 12b: 3:30pm – 5:00pm

PFAS Sampling and Analysis Issues

Session Chair: Elizabeth Denly, TRC Environmental Corporation, Lowell, MA

3:30 **PFAS Cross-Contamination Study Update – Follow-up Analysis of Sampling Equipment and Associated Products**
James Occhialini, Alpha Analytical, Westborough, MA

4:00 **Closing the PFAS Mass Balance: The Total Oxidizable Precursor (TOP) Assay**
Karla Buechler, TestAmerica, West Sacramento, CA

4:30 **Considerations for Analysis of Perfluoroalkyl and Polyfluoroalkyl Substances in Non-Drinking Water Samples**
Stephen Zeiner, Environmental Standards, Inc., Valley Forge, PA

Session 13a: 1:30pm – 3:00pm

Tools to Support Your Sustainable Remediation Strategy

SURF SUSTAINABLE REMEDIATION FORUM

Session Chair: Maile Smith, Northgate Environmental Management, Oakland, CA

1:30 **New Toolkit of Remediation Technologies & Sustainability for Management of Petroleum Hydrocarbon Sites**
Parisa Jourabchi, Golder Associates Ltd., Vancouver, BC, Canada

2:00 **SURF-UK's Checklist of Sustainability Assessment Criteria or Indicators for Contaminated Land Management Option Appraisal**
Leroy Bealer, Shell Oil Products, Nazareth, PA

2:30 **A Survey of Decision Support Tools for Comparing Cleanup Options and Increasing Decision-Making Confidence**
Paul Favara, Jacobs, Gainesville, FL

Session 13b: 3:30pm – 4:30pm

Advances in Remediation

Session Chair: Paul Dombrowski, ISOTEC Remediation Technologies, Lawrenceville, NJ

3:30 **Jetting an Advanced Oxidative Foam to Remove Aqueous Film-Forming Foam Residuals from Soils**
William Kerfoot, Kerfoot Technologies, Mashpee, MA

4:00 **Enhancing ROI and Balancing Geochemistry at Superfund Sites – Challenges and Limitations**
Ravi Srirangam, PeroxyChem, Philadelphia, PA

Session 14: 1:30pm – 4:30pm

Current Issues in Water Sustainability and Remediation

Session Chairs: Karen Petho, US Department of Transportation, Volpe Center, Cambridge, MA

Millie Garcia-Serrano, M.P.H., MassDEP, Southeast Region, Lakeville, MA

1:30 **Perspectives in Water Policy: Balancing Water Conservation, Protection and Sustainability Needs for the Future Generation**
Kathleen Baskin, Weston & Sampson, Peabody, MA

2:00 **Population Density, Stream Order, and Geology – Geographic Drivers in Stressed Watersheds**
John Kastrinos, Haley & Aldrich, Inc., Boston, MA

2:30 **Unintended Impacts of Water Conservation on Residual Chlorine and Waterborne Pathogens in Municipal Water Supplies**
David Krause, Forensic Analytical Consulting Services, Tallahassee, FL

3:00 **BREAK**

3:30 **Protecting Our Sensitive Population: The Massachusetts Lead in Schools Drinking Water Initiative**
Yvette DePeiza, MassDEP, Boston, MA

4:00 **A Comprehensive Approach to Nitrogen Management in Coastal Estuaries: The Cape Cod Experience**
Brian Dudley, MassDEP, Lakeville, MA

Session 15: 1:30pm – 5:00pm

Practical Soil and Groundwater Cleanup Technology Applications

Remediation Partners

Session Chair: Richard Cartwright, Cartwright Environmental, East Amherst, NY

1:30 **How to Compare the Real Cost of Anaerobic Substrate Applications**
Dick Raymond, Terra Systems, Claymont, DE

2:00 **Managing Groundwater and Other Data from the Field to the Map**
Dave Rich, Geotech Computer Systems, Centennial, CO

2:30 **FROG-5000: Applications, Improvements, and Remote Monitoring**
Patrick Lewis, Defiant Technologies, Albuquerque, NM

3:00 **BREAK**

3:30 **Optimizing Design of Non-Traditional Biotreatment Solutions (EVO PRBs) for Legacy Nitrate Contamination**
Fritz Hostrop, Terra Systems, Salem, MA

4:00 **International Case History: Successful Cleanup of an Eco-Sensitive, Petroleum-Impacted Site**
Richard Cartwright, Cartwright Environmental, East Amherst, NY

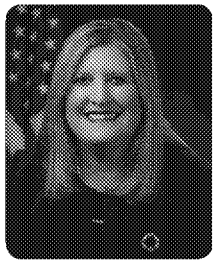
4:30 **Successful Completion of a Major Design-Build Upland and Sediment MGP Project**
Steven Laszewski, Foth – GBWI, Green Bay, WI

LUNCHEON

Wednesday, October 17, 2018 12:00pm – 1:30pm

EPA Priorities for a Healthy New England

Alexandra Dapolito Dunn, Regional Administrator, US EPA, Region 1, Boston, MA



EPA Regional Administrator Alexandra Dunn was appointed to EPA Region 1 in January 2018. She is focused on making progress with mission-oriented work and continuing to build strong partnerships with state and local government as well as other organizations. She will speak about the priority work at EPA including the Superfund Task Force, emerging contaminants and PFAS efforts in New England, and clean water initiatives.

WORKSHOPS/SOCIAL

Workshop 8 6:30pm – 9:30pm

PFAS Treatment Technologies and Remediation Strategies

Dorin Bogdan, Ph.D., AECOM, Grand Rapids, MI
Shangtao Liang, Ph.D., AECOM, Atlanta, GA
Jennifer Guelfo, Ph.D., Brown University Superfund Research Program, Providence, RI
Catherine Swanson, Evoqua Water Technologies, La Mirada, CA

Per- and polyfluoroalkyl substances (PFAS), including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), have been found to occur globally and are the subject of increasing regulatory focus and concerns. Excavation and off-site incineration of PFAS-impacted soils has been the preferred remedy for PFAS-impacted soil in the U.S.; however, off-site incineration is generally cost-prohibitive. Granular activated carbon (GAC) treatment for PFOA- and PFOS-impacted water has been demonstrated at full-scale treatment plants in the U.S. while the other technologies are also under development for full-scale commercialization and field testing, such as ion exchange resin and reverse osmosis. These ex-situ technologies separate and concentrate PFAS on the treatment media and require off-site incineration of spent media or PFAS-concentrated waste. Treatment challenges have led to the development of ex-situ, on-site PFAS destruction technologies as well as the evaluation of emerging in-situ treatment options.

This course will review off-the-shelf technologies and discuss their applications and the need of destruction technologies that are currently under research and development. The participants will also learn how to evaluate treatment performance data and develop a treatment strategy when PFAS are commingled with other contaminants.

Course learning objectives include:

- Explain PFAS properties and sources
- Identify general challenges and technical considerations on treating PFAS
- Differentiate off-the-shelf treatment technologies available for PFAS treatment
- Recognize upcoming separation and destruction technologies
- Evaluate treatment performance
- Illustrate treatment scenarios and remediation strategies when treating PFAS and co-contaminants

Workshop 9 7:00pm – 9:00pm

Environmental Ethics: A Tragedy of the Commons Perspective

Richard T. Cartwright, PE, CHMM (IHMM Fellow), CPIM (APICS Fellow), Cartwright Environmental, East Amherst, NY
Richard Raymond, Terra Systems, Claymont, DE
Phil Deakin, PE, Deakin Technology Partners, Omaha, NE

Garrett Hardin, American Ecologist and Professor of Biology, hypothesized in his landmark *Science Magazine* (1968) "Tragedy of the Commons" essay that, as our human population increases, there will be mounting pressures on resources at the local and global levels, leading to overexploitation and ruin. The following example of the logic of the commons was presented: Fourteenth century Britain was organized as a loosely aligned collection of villages, each with a common pasture for villagers to graze horses, cattle, and sheep. Each household attempted to gain wealth by putting as many animals on the commons as it could afford. As the village grew in size and more and more animals were placed on the commons, overgrazing ruined the pasture. No stock could be supported on the commons thereafter. As a consequence of population growth, greed, and the logic of the commons, village after village collapsed.

Today, environmental professionals are confronted by a plethora of competing dynamics: globalization vs. national interests; urban vs. rural perspectives; tribal interests vs. individualism; abundance vs. scarcity; left wing politics vs. right wing politics; real news vs. fake news (alternative facts); and demands to do more with less resources provided. Collectively reviewing our environmental ethics from a "Tragedy of the Commons" perspective will help us to reduce future uncertainty and facilitate sustainable, forward-thinking decision-making based upon our professional integrity.

EVENING SOCIAL

Wednesday 5:00pm – 7:00pm

Host Bar (limited duration)
Refreshments & Light Hors d'Oeuvres

Free to all registered conference attendees

POSTER SESSIONS

Authors will be available for individual discussion at their posters on both Tuesday & Wednesday from 3:00pm – 6:00pm

PLATFORM SESSIONS

Session 16: 9:00am – 12:00pm

PFAS: State Case Studies, Policy Developments, and Lessons Learned Panel

Session Chair: Jennifer Griffith, Northeast Waste Management Officials' Association, Boston, MA

During this panel-style session, each speaker will present his/her state's experience with PFAS, including case studies, policy developments, future directions, and lessons learned. Following the presentations, they will all participate in a Q&A panel. Bring your questions!

9:00 **Vermont**
Richard Spiese, Vermont Department of Environmental Conservation, Waste Management and Prevention Division, Montpelier, VT

9:30 **New Hampshire**
Brandon Kernen, New Hampshire Department of Environmental Services, Drinking Water and Groundwater Bureau, Concord, NH

10:00 **BREAK**

10:30 **Massachusetts**
Paul Locke, Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup, Boston, MA

11:00 **New York**
Jason Johnson, New York State Department of Environmental Conservation, Division of Environmental Remediation, Albany, NY

11:30 **Panel Discussion**

Session 17: 8:30am – 12:00pm

Environmental Justice

Session Chairs: Deneen Simpson and Thomas Potter, MassDEP, Boston, MA

8:30 **Environmental Justice at the U.S. Environmental Protection Agency**
Gevon Solomon, US EPA, Boston, MA

9:00 **Environmental Justice at the Massachusetts Department of Environmental Protection**
Deneen Simpson, MassDEP, Boston, MA

9:30 **Brownfields Urban Compliance Initiative in an EJ Community**
Juliet Swigor, MassDEP, Worcester, MA

10:00 **BREAK**

10:30 **Commitment to Community: Lessons Learned from Site Assessment and Remediation in an Environmental Justice Community**
Carol Bois, Bois Consulting Co., Inc., Framingham, MA

11:00 **Diversity and Civil Rights at the Massachusetts Department of Environmental Protection**
Michelle Waters-Ekanem, MassDEP, Boston, MA

11:30 **Title VI at the U.S. Environmental Protection Agency**
Sharon Wells, US EPA, Boston, MA

Session 18: 8:30am – 12:00pm

Brownfields

Session Chair: Frank Peduto, JMT, Latham, NY

8:30 **Optimizing Sustainability in Development Practice for Impacted Sites Applying "R's" to Demolition, Remediation and Construction**
Brandon Fagan, GEI Consultants, Inc., Dover, MA

9:00 **Integrated Remediation Transforms a Brownfield Site into a Neighborhood Health Clinic**
Karen Kinsella, GZA GeoEnvironmental, Glastonbury, CT

9:30 **Brownfield Redevelopment Under the Massachusetts Contingency Plan Using Seven Remediation and Mitigation Techniques**
Alice Blayney, Geosyntec Consultants, Brookline, MA

10:00 **BREAK**

10:30 **Implications of Long-Term Legacy Sites – Management and Strategies to Avoid the Courtroom**
Steve Luis, Ramboll, Irvine, CA

11:00 **Combined Treatment Train to Address Mixed Plume at Urban Brownfield**
Joseph Good, Langan Engineering & Environmental Services, New York, NY

11:30 **NY State Brownfield Cleanup Program Case Study: Was It Destiny or Fate?**
Karen Cahill, New York State Department of Environmental Conservation, Syracuse, NY

Session 19: 8:30am – 12:00pm

Site Remediation Applications

Session Chair: Douglas W. Grosse, DWG Consultants, Cincinnati, OH

8:30 **Horizontal Remediation Well Technology Applications for Successful In-Situ Chemical Oxidation and In-Situ Anoxic Biodegradation**
Kyle Carlton, Directional Technologies, Inc., Miramar Beach, FL

9:00 **Leveraging High-Resolution Site Characterization Methods to Optimize Remediation of Chlorinated Solvent Contamination in Southern France**
Bradley Green, Sanborn, Head & Associates, Inc., Concord, NH

9:30 **Successful Closure of a DNAPL Site – Lessons Learned**
Craig Cox, Cox-Colvin & Associates, Inc., Plain City, OH

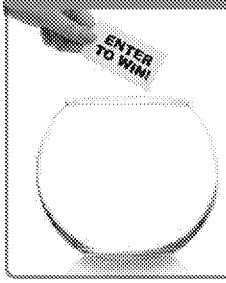
10:00 **BREAK**

10:30 **Assessment of PlumeStop to Manage Back Diffusion at a Fractured Sandstone Site**
Michael Brown, WSP USA, Boston, MA

11:00 **Sustainable Remediation Combining Mobile Dual Phase Extraction with Concurrent Injection of a Carbon-Based Amendment**
Frank Barranco, EA Engineering, Science, and Technology, Inc., PBC, Hunt Valley, MD

11:30 **In Situ Thermal Remediation (ISTR) of Emerging Contaminants**
Emily Crownover, TRS Group, Inc., Longiew, WA

DRAWING



Enter to win a free registration to one of our next two conferences!

Entry and drawing will take place during each of the Thursday morning sessions.

ONE WINNER IN EACH SESSION!

Must be present to win. Second place winners will receive free 2019 AEHS Foundation Membership. Members receive reduced registration! Drawings will take place at the conclusion of each session.

Posters may be viewed throughout the day on Tuesday, October 16th and Wednesday, October 17th. Authors will be available for individual discussion at their posters from 3:00pm – 6:00pm each day. Refreshments and hors d'oeuvres will be served during the poster sessions.

ENVIRO.wiki – Tech Transfer in the 21st Century
Ed Alperin, Draper Aden Associates, Raleigh, NC

Antibiotic Concentration and Antibiotic-Resistant Bacteria in Two Shallow Urban Lakes After Stormwater Event Student
Kwaku Anim-Larbi, Hohai University, Nanjing, Jiangsu, China

Phytoremediation of Heavy Metal Polluted Mining Site Using Kenaf (*Hibiscus cannabinus* Linn.) and Sunflower (*Helianthus annuus* Linn.)
Babatunde Saheed Bada, Federal University of Agriculture, Abeokuta, Ogun, Nigeria

A Historical Perspective on Use of Induced Fractures in Various Geologic Settings
Drew Baird, FRx, Greenville, SC

Advances in Oil Spill Forensics Using Biomarkers and Isotope Ratio Technique
Harry Behzadi, SGS, Rutherford, NJ

Multi-Amendment Remedial Injections to Treat PCE and TCE in a Clay and Silt Aquifer
Alice Blayney, Geosyntec Consultants, Brookline, MA

ISCO Treatment in Acid Sulfate Soils
Christa Bucior, GHD, Niagara Falls, NY

An Innovative Approach to Automatic Control of Coal Tar Recovery System at MGP Sites
Adam Chen, Burns & McDonnell Engineering, Inc., Downers Grove, IL

Considerations When Using Rotosonic Drilling Methods to Core Bedrock
Dariusz Chlebica, Geosyntec Consultants, Acton, MA

Funding Trends in Hormetic Research Student
Maureen Cottrell, University of Massachusetts, Amherst, MA

Hormesis Findings Affect Perfluoroalkyl (PFA) Agents Risk Assessment
Gaurav Dhawan, University of Massachusetts, Amherst, MA

Hormetic Dose Responses Are Commonly Induced by Perflouroalkyl Acids (PFAAs)
Gaurav Dhawan, University of Massachusetts, Amherst, MA

Chemical Oxidation of PFAS: Insight into Applying Demonstrated Technology for a Recalcitrant Compound Class
Paul Dombrowski, ISOTEC Remediation Technologies, Lawrenceville, NJ

Activated Carbon Modeling Tool for Evaluating Sediment Remediation of PCBs and PAHs
David Flannery, Cabot Corporation, Boston, MA

A Sustainable Remediation Project Utilizing the New Decision-Making Software Guided Interactive Statistical Decision Tools (GiSdT)
Aharon Fleury, Neptune and Co., Inc., Lakewood, CO

A Probabilistic Approach for Determining Risk-Based Exposure Concentrations for Trichloroethylene (TCE)
Norman Forsberg, Arcadis, Clifton Park, NY

Modeling of Dredged Sediment Plume for a Large Sediment Remediation Project
Matt Graham, Environment Canada, Burlington, ON, Canada

ERH Remediation of Chlorinated VOCs in Shale Bedrock at Rutgers University Campus
Sunila Gupta, Haley & Aldrich, Inc., Parsippany, NJ

Statistical Tools for Developing Monitored Natural Attenuation Evidence – Beyond Time-Series Plots
Sunila Gupta, Haley & Aldrich, Inc., Parsippany, NJ

Modeling Oil Spills in Surface Water: New Approaches Using GNOME
Matt Hodge, Hodge.WaterResources, LLC, Brighton, MA

A Calculation Method for Air Emissions from Large Areas of Contaminated Soil
Katie Hoyt, Geosyntec Consultants, Brookline, MA

Sea Level Rise and Flooding Impacts in Boston from the Historic "Bomb Cyclone" on January 4, 2018
Anthony Julian, Haley & Aldrich, Inc., Charlestown, MA

ASTM Method D8028 Determination of Dissolved Gases in Water
Anne Jurek, EST Analytical, Fairfield, OH

Soil Remediation via Thermally Enhanced Soil Vapor Extraction and Bioremediation at a Former Chemical Facility
Justin King, CHA Consulting, Inc., Albany, NY

Sustainable EDTA-Based Washing of Pb and Other Toxic Metals Contaminated Soils
Domen Lestan, University of Ljubljana, Ljubljana, Slovenia

Occurrence and Removal of Controlled Substances in Conventional Wastewater Treatment Plants Student
Jiayue Luo, University of Massachusetts, Lowell, MA

Public Engagement Toolkit for Environmental Assessment and Remedial Activities in Spanish Speaking Communities Across the United States
Raimundo Matos, AECOM, Chelmsford, MA

The Role of Copper(II) Ions in Modified Bismuth Oxychlorides for the Photodegradation of Atrazine Student
Matthew Moyet, University of Maine, Orono, ME

Assessing and Communicating Environmental Exposures and Risks at Brownfield Sites
Michael Musso, HDR, Mahwah, NJ

Properties of Silver Nanoparticles Driving Their Cytotoxicity in an In-Vitro Test System Student
Matthew Nkoom, Hohai University, Nanjing, Jiangsu, China

Relationships Between Water Loss, Sediment Deposition, and Pond Age in Lagos State, Nigeria
Olorunwa Eric Omofunmi, Federal University, Oye-Ekiti, Ekiti, Nigeria

Pretreatment and Carbon Configuration to Help Optimize Removal of Perflouroalkyl Substances
Benjamin Porter, APTIM, Canton, MA

Applications of Legendre Wavelets in Environmental Modeling
Mohsen Razzaghi, Mississippi State University, Mississippi State, MS

Risk-Based Assessment of Remedial System Off-Gas Treatment Requirements
Allison Roche, Woodard and Curran, Inc., Dedham, MA

Manufacture of Thin-Film PVDF Membranes via Soft Lithography STUDENT
Akarapan Rojjanapinun, University of Massachusetts, Lowell, MA

Using Pilot Test Data for the Design of Active Sub-Slab Vapor Mitigation Systems
Robert Roth, Terracon Consultants, Inc., Wheat Ridge, CO

A Novel and Environmentally Friendly Technique for Remediation of Acid Mine Drainage-Impacted Water
Abhishek RoyChowdhury, Stevens Institute of Technology, Hoboken, NJ

Comparing PFAS Removal Performance of Granular Activated Carbons from Water in the Presence of NOM
John Satterfield, Cabot Corporation, Marshall, TX

Hydrophysical Testing as an Investigation Tool to Delineate Discreet Flow Zones in Shallow Bedrock Aquifers
Samuel Schoenmann, WSP USA, Boston, MA

Results of VI Mitigation Using HVAC System Engineering Controls from a Multi-Building Demonstration Project
David Shea, Sanborn, Head & Associates, Inc., Concord, NH

Combined Surfactant and Oxidant Application for Simultaneous Contaminant Liberation and Destruction
Dan Socci, EthicalChem, South Windsor, CT

Applying In-Situ Thermal Remediation in a Complex Urban Setting with Multiple Regulatory Agencies
Lauren Soos, TRS Group, Inc., Longview, WA

An Overview of the Historic Massachusetts MGP Industry
Thomas Speight, O'Reilly, Talbot & Okun Associates, Inc., Springfield, MA

Assessing Potential Risks from Environmental Radiation: Sources, Guidelines, and Risk Evaluation
Christopher Teaf, Florida State University, Tallahassee, FL

Enhanced Attenuation of PFAS and VOCs in Groundwater Using ZVI and PlumeStop® Liquid Activated Carbon™
Bruce Thompson, De Maximis, Inc., Windsor, CT

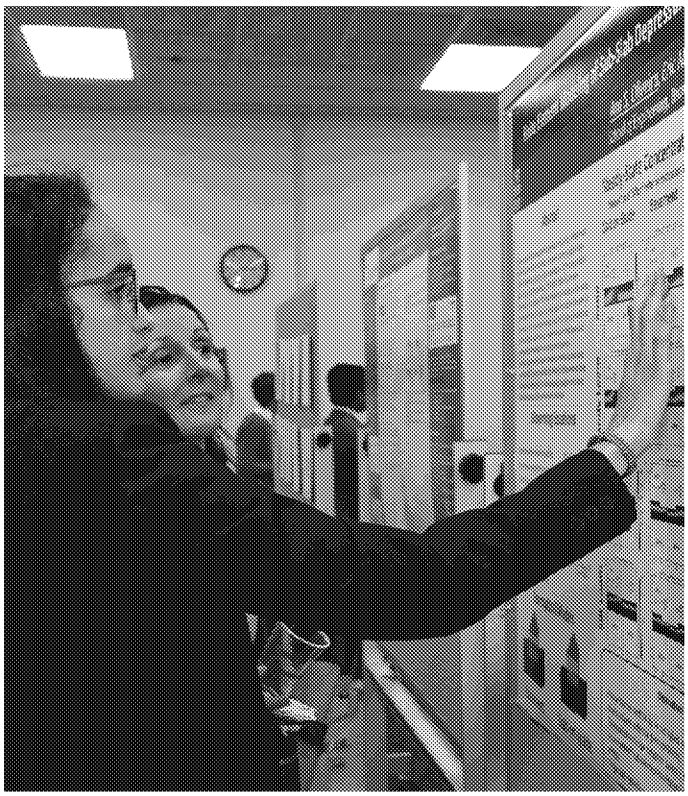
Global Climate Change: Causes, Sources, Economic Impacts, and Efforts to Reduce Emissions
Jerry Vorbach, Green Services, LLC, Montclair, NJ

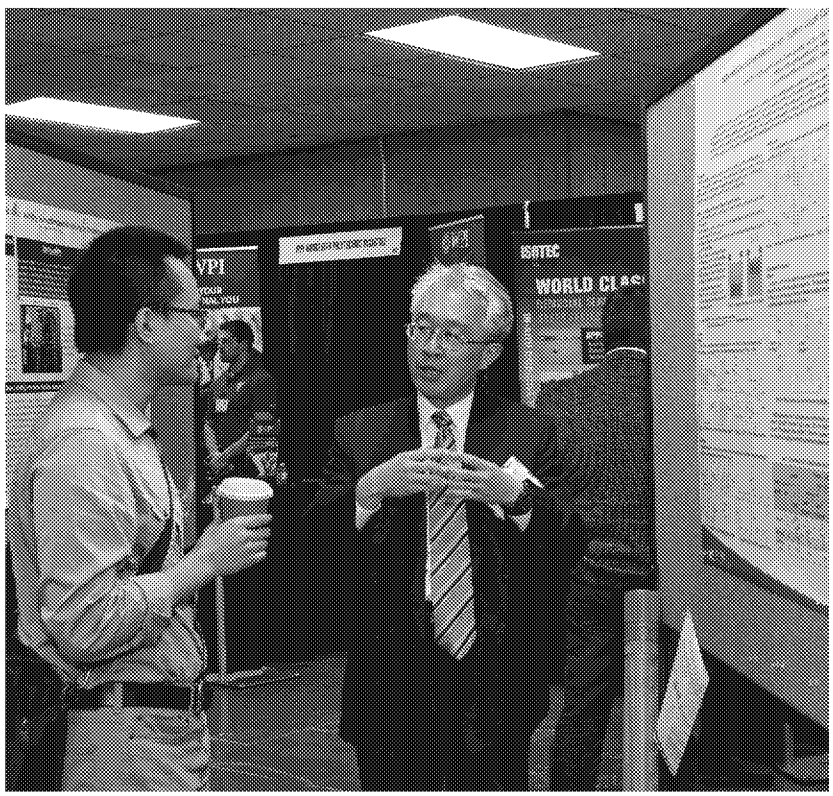
Leveraging In-Field Data Management and Visualization Tools to Optimize High Resolution Site Characterization Investigations
Sam Warner, Sanborn, Head & Associates, Inc., Concord, NH

Environmental Controls on Subsurface Respiration Rates in a Subalpine Soil, East River, CO
Matthew Winnick, University of Massachusetts, Amherst, MA

Removal of Chlorinated Volatile Organic Carbon Using Novel Zero Valent Iron (ZVI) Media
Yu Yang, Höganäs Environment Solutions, Cary, NC

Evaluating the Thresholds of Municipal Sludge for Forestry Utilization in Chinese Provincial Capital Cities STUDENT
Xiaoxia Zhang, Beijing Forestry University, Beijing, China





GENERAL INFORMATION

REGISTRATION INFORMATION

Advance and on-site registration includes admission to all platform sessions, poster sessions, socials, the exhibit area, and coffee breaks. Workshops and lunches are NOT included in the registration fee, but may be purchased separately on the conference registration form. Registrations received after September 28, 2018 will be charged a $75.00 late fee. Full payment, including those pre-registrations secured by purchase order, must be remitted on or before the first day of the conference. Non-compliance will result in a $25.00 processing fee for any resulting billings. Phone-in registrations will not be accepted.

PURCHASE ORDERS

Purchase orders will be accepted from institutions and agencies during pre-registration only. Late registration (after September 28th) and on-site registration requires full payment at the time of registration.

CANCELLATIONS

Cancellations on or before September 28, 2018 may receive a refund minus a $50.00 cancellation fee. No refunds will be issued after September 28th, however, you may substitute a conferee rather than cancel the registration entirely.

WORKSHOPS

Workshops are not included in conference registration fee and must be purchased separately on the registration form. Early registration is encouraged as space is limited and materials must be prepared in advance. Please check the workshop schedule carefully when selecting workshops. Same day workshops may run simultaneously. Workshops are free to government personnel (enter discount code REG-MSF in the "discount code" field at checkout).

POSTER SESSIONS

Posters may be viewed on Tuesday and Wednesday. Authors will be available at their posters for individual discussion on both Tuesday and Wednesday, October 16th and 17th from 3:00pm - 6:00pm.

EXHIBIT INFORMATION

An exhibition of relevant technologies and services will be featured Tuesday, October 16th, from 9:00am - 7:00pm, Wednesday, October 17th, from 9:00am - 7:00pm, and Thursday, October 18th, from 9:00am - 12:00pm. A limited number of booths are available. See website (exhibitor information) for details or contact Brenna Lockwood at (413) 549-5170 or brenna@aehsfoundation.org.

LOCATION AND TRAVEL INFORMATION

The conference will take place in the Murray D. Lincoln Campus Center, University of Massachusetts at Amherst, located in the scenic Connecticut River Valley. Amherst is served by major airlines through Bradley International Airport in Windsor Locks, Connecticut (about 1 hour by car) and Logan Airport in Boston (about 2 hours by car). Rental cars and bus service are available from both airports.

Seemo Shuttle Service and Valley Transporter provide shuttle service to and from airports, Amtrak, or bus stations.

Seemo Shuttle Service: (800) 908-2829 or (413) 586-1120 or visit www.seemoshuttle.com

The Valley Transporter: RESERVATIONS ARE REQUIRED, (800) 872-8752 or (413) 253-1350 or visit www.valleytransporter.com

Looking for things to do in the area?
Visit www.amherstarea.com

PARKING

Parking is available in the Campus Center Parking Garage at One Campus Center Way. Access to the Campus Center is on Level 2 of the parking garage. Follow signs to the Campus Center. Attendees are responsible for paying their own parking. Daily rate is currently $6.50. Beginning in 2018, there is no longer a garage attendant. Pay stations are now located in the corner on each level. You will receive a ticket upon arrival. Before leaving, you will need to insert this ticket into one of the pay stations. The pay station will return your paid ticket, which you will use at the garage exit.

ACCOMMODATION INFORMATION

Registrants are responsible for their own hotel arrangements. We recommend making reservations early. Area hotel information is provided below.

HOTEL UMASS: A room block has been secured at Hotel UMass at the Campus Center. The rate is $160.00 per night. For those attendees wishing to stay at Hotel UMass, where the conference will be held, call the hotel directly at (877) 822-2110 or (413) 549-6000 and mention group code CS18C. Or make your reservation online (www.hotelumass.com) using group code CS18C (enter in PROMO field). The cut-off date for Hotel UMass is September 14, 2018. Rates and reservations are not guaranteed after this date.

Other local hotels:
Comfort Inn (413) 584-9816
Courtyard Marriott (413) 256-5454
Econo Lodge (413) 582-7077
Hampton Inn (413) 586-4851
Holiday Inn Express (413) 582-0002
Howard Johnson (413) 586-0114
Knights Inn Hadley (413) 585-1552
Lord Jeffery Inn (413) 256-8200

CONFERENCE COORDINATOR: Brenna Lockwood, AEHS Foundation
(413) 549-5170 | brenna@aehsfoundation.org

REGISTRATION: Amanda Michaels, AEHS Foundation
(413) 549-5170 | Amanda@aehsfoundation.org

REGISTRATION

REGISTRATION DEADLINE IS SEPTEMBER 28, 2018 TO AVOID LATE FEE / Online Registration is available at www.AEHSFoundation.org

Name: _____ LSPA member (please check) ☐

Affiliation: _____

Address: _____ City: _____

State: _____ Zip _____ Country _____ Phone: _____

E-mail: _____

REGISTRATION FEES

Each registration option is for a single person and is not to be shared by individuals within a company.

Full Three Days	$550	
AEHS Foundation or ISEF Member	$450	
Presenters, Sponsors, Supporters, Exhibitors, and Academics	$295	
Government Personnel and Advisory Board	$150	
Students	$40	
Tuesday, October 16	$225	
AEHS Foundation or ISEF Member	$175	
Presenters, Sponsors, Supporters, Exhibitors, and Academics	$150	
Government Personnel and Advisory Board	$75	
Wednesday, October 17	$225	
AEHS Foundation or ISEF Member	$175	
Presenters, Sponsors, Supporters, Exhibitors, and Academics	$150	
Government Personnel and Advisory Board	$75	
Thursday, October 18	$125	
AEHS Foundation or ISEF Member	$75	
Presenters, Sponsors, Supporters, Exhibitors, and Academics	$50	
Government Personnel and Advisory Board	$50	
Note: All registrations (full and single day) received after September 28, 2018 will be assessed a $75 late fee	$75	

WORKSHOPS

Workshop rates are $110 for conference registrants and $260 for the workshop only registrants, unless otherwise indicated.*

Please check the schedule — same day workshops run simultaneously. See program for workshop descriptions.

Monday, October 15, 2018		
1. Environmental Forensics: Applications and Advances in Fingerprinting Techniques to Determine Responsibility for Releases of Organic Contaminants into the Environment 1:00pm – 4:00pm	$110/260	
2. Tools for Evaluating Sustainability at Tier 2 Sites 1:00pm – 5:00pm	$110/260	
3. Per- and Polyfluoroalkyl Substances (PFAS): The Latest Information 1:00pm – 5:00pm	$110/260	
4. A View From Above: Environmental Monitoring and Surveillance Through Unmanned Aerial Vehicles (UAVs) 1:00pm – 5:00pm	$110/260	
Tuesday, October 16, 2018		
5. Indicators, Tracers and Surrogates (ITS) for Chlorinated Vapor Intrusion (CVI): Pursuing Additional Observations 8:30am – 12:00pm	$110/260	
6. Improved Metrics for LNAPL Remedial Technology Selection 6:30pm – 9:30pm	$110/260	
7. Per- and Polyfluoroalkyl Substances (PFAS) Remediation Workshop 6:30pm – 9:30pm	$110/260	
Wednesday, October 17, 2018		
8. PFAS Treatment Technologies and Remediation Strategies 6:30pm – 9:30pm	$110/260	
9. Environmental Ethics: A Tragedy of the Commons Perspective 7:00pm – 9:00pm	$110/260	

All workshops are FREE to municipal, state, and federal personnel registered for the conference. Pre-registration is required. If you are registering as "workshop only" and are not registering for the conference, the workshop fee applies.

CEU CREDITS ADMINISTRATIVE CHARGE

$50 ea. _____

This is a one time fee for all registrants participating in the accreditation program. For further information call 413-549-5170.

Check type of CEU desired ($50.00 each):

☐ **MA LSP** ☐ **CT LEP** ☐ **FL PE** ☐ **NJ LSRP** ☐ **Certificate of Attendance (NH PE's select this option)**

LUNCHES

Tuesday (Luncheon Speaker)	$25	
Wednesday (Luncheon Speaker)	$25	

TOTAL CONFERENCE FEES _____

INDICATE METHOD OF PAYMENT — PLEASE CHECK ONE

☐ Check: please make checks payable to AEHS Foundation, Inc. [FIN #262624347]

☐ Purchase order (P.O. number must be submitted with this form, fee is to be paid in full by September 28, 2018)

☐ Visa ☐ Mastercard ☐ Discover ☐ American Express

Card # _____ Expiration: _____

Name of Cardholder: _____ Signature: _____

Purchase orders will be accepted from institutions and agencies during pre-registration only. Full payment must be received in our office by September 28th, 2018. Non-compliance will result in a $25.00 processing fee for any resulting billings. Cancellations will be assessed a $50.00 fee.

Please fax, scan/email, or mail completed form with full payment BY SEPTEMBER 28th TO AVOID FEE INCREASE: AEHS Foundation, 150 Fearing Street, Suite 21 Amherst, MA 01002, Tel: 413-549-5170, Fax: 413-549-0579, Email: amanda@aehsfoundation.org. ONLINE REGISTRATION IS AVAILABLE AT www.AEHSFoundation.org

Registration Bonus AEHS Foundation Membership

2019 Membership to AEHS Foundation, free to attendees who register by September 28, 2018

PLEASE NOTE: **Membership goes into effect in January 2019 and does not entitle the registrant to apply as a member on the current form.**

PLEASE CHECK ONE:

In order to claim this registration bonus, please choose which journal you would like to receive.

(one of the following journals comes with membership)

☐ Soil & Sediment Contamination: An International Journal

☐ International Journal of Phytoremediation

☐ HERA (Human and Ecological Risk Assessment)

More information about these journals and AEHS Foundation membership may be found at AEHSFoundation.org

Fax your registration today: 413-549-0579

Scan and email to: amanda@aehsfoundation.org

or register online AEHSFoundation.org

CANCELLATIONS

on or before September 28, 2018 will receive a refund minus a $50.00 cancellation fee. No refunds will be issued after September 28th, however, you may substitute a conferee rather than cancel the registration entirely.

AEHS Foundation

150 Fearing Street, Suite 21
Amherst, MA 01002

Register by September 28th and SAVE! *Registration Form Inside*

The 34th Annual International Conference on Soils, Sediments, Water and Energy

October 15-18, 2018

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SCIENTIFIC ADVISORY BOARD

The AEHS Foundation attributes the success of this conference, in large part, to a very dedicated and hardworking Scientific Advisory Board (SAB). The SAB evaluates abstract submissions, recommends invited papers and presenters, advises with regard to session topics, and serves as conference ambassadors. The SAB is crucial to the conference development. Care is taken to create a board that represents philosophical, scientific, regulatory, and geographical balance.

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